



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,307	09/29/2003	Martin W. Rupich	05770-156002	3889
26161	7590	07/15/2005	EXAMINER	
FISH & RICHARDSON PC 225 FRANKLIN ST BOSTON, MA 02110			CLEVELAND, MICHAEL B	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 07/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/673,307

Applicant(s)

RUPICH ET AL.

Examiner

Michael Cleveland

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44, 51-58, 66-84 and 86 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-44, 51-58, 66-84 and 86 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 092903.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 9/29/2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. (The International Search Report for PCT/US01/32229 and the Rupich article are not present in the parent applications; the copies of the Koster and Tanaka articles in the parent applications are incomplete. Complete copies are requested.)
2. The information disclosure statement filed 9/29/2003 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. There is no statement of relevance for WO 99/35083 in the application.

Specification

3. The disclosure is objected to because of the following informalities: The status of the parent applications (both abandoned) should be updated in the first paragraph.
Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 6-8, 20-25, 35-37, 54-55, 57, 66-68, 78-81, and 83 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1762

Claims 6-8, 20-25, 55, 57, 66-67 recite the limitation "the layer of the intermediate". There is insufficient antecedent basis for this limitation in the claim. The claim has been interpreted as referring to the "intermediate" of the parent claims.

Claim 35 recites the limitation "the Lewis base". There is insufficient antecedent basis for this limitation in the claim. The claim would be clear if it depended from claim 34 (see, e.g., claims 3-5). The claim has been treated as requiring a nitrogen-containing Lewis base.

Claim 36 recites the limitation "the nitrogen-containing compound". There is insufficient antecedent basis for this limitation in the claim. It would be clear if it depended from claim 35, which depended from claim 34. The claim has been treated as requiring an ammonia or amine Lewis base.

Claim 37 recites the limitation "the superconductor material". There is insufficient antecedent basis for this limitation in the claim. The claim has been treated as at least inclusive of forming a superconductive oxide from the intermediate of the parent claims.

Claim 54 is unclear because it states that the amine may be selected from a group including CH_3CN and $\text{C}_5\text{H}_5\text{N}$, but these compounds are not amines. The claim has been treated as inclusive of these compounds even though they are not amines.

Claims 55, 57, and 66-67 recite the limitation "the first layer". There is insufficient antecedent basis for this limitation in the claim. The claim has been interpreted as referring to the "layer" of the parent claims.

Claims 78-81 recite the limitation "the intermediate of the rare earth metal-alkaline earth metal-transition metal". There is insufficient antecedent basis for this limitation in the claim because the parents claims refer to a metal oxide. The claim has been interpreted as referring to "the intermediate of the rare earth metal-alkaline earth metal-transition metal oxide" of the parent claims.

Claim 83 recites the limitation "the transition metal". There is insufficient antecedent basis for this limitation in the claim. The claim has been interpreted as referring to the copper of the parent claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1762

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-6, 9, 12, 15-23, 26, 29, 32-36, 38-39, 42, 51-54, 56, 58, 82-84, and 86 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizuta et al. (EP 0 277 020, hereafter '020).

'020 teaches a method comprising:

disposing a precursor solution onto a surface of a layer to form a precursor film (p. 3, lines 5-10), the precursor film including, for example, yttrium stearate, barium naphthenate, and copper naphthenate (Example 11); and

treating the precursor film to form YBCO (col. 3, lines 31-40). Chemical reactions inherently proceed by forming intermediates. Therefore, the method must form an intermediate of the YBCO.

Claim 2, 16, 33, 56: The substrate may be treated for 1 hour (p. 3, line 25).

Claims 3-5, 17-19, 34-36, 51-54: The solution may contain a Lewis base, such as butanol (Example 11) or amines, such as dimethylamine (p. 2, lines 50-56).

Claim 6, 20-23, 38: The layer may have a thickness of 20 microns (p. 3, lines 33-35).

Claims 9, 12, 15, 26, 29, 32, 39, 42, 82-84, 86: Copper propionate may be used (p. 3, line 40; Example 2).

8. Claims 15, 17, 24, 32, 34, 37, 51, 58, and 86 are rejected under 35 U.S.C. 102(e) as being anticipated by Smith et al. (U.S. Patent 6,172,009, hereafter '009).

'009 teaches a method comprising:

disposing a precursor solution onto a surface of a layer to form a precursor film, the precursor film including, for example, yttrium trifluoroacetate, barium trifluoroacetate, and copper trifluoroacetate (col. 8, lines 45-53); and

treating the precursor film to form YBCO via an oxyfluoride intermediate (col. 3, lines 36-42).

Claim 17, 34, 51: The solvent may be ethers or alcohols (Lewis bases).

Art Unit: 1762

Claim 24, 37: The critical current density may be 1.1×10^6 A/cm² (Example 2).

Claim 38: The thickness may be one micron (col. 10, lines 10-12).

9. Claims 15-17, 20-24, 32-34, 37-38, 51, 58, and 86 are rejected under 35 U.S.C. 102(e) as being anticipated by Fritzemeier et al. (U.S. Patent 6,022,832, hereafter '832). (Cima et al. (U.S. Patent 5,231,074 is cited as evidence because it is incorporated by reference as giving details of the fluoroacetate method of '832)

'832 teaches a method comprising:

disposing a precursor solution onto a surface of a layer to form a precursor film, the precursor film including, for example, yttrium trifluoroacetate, barium trifluoroacetate, and copper trifluoroacetate (col. 8, lines 45-53); and

treating the precursor film to form YBCO via an oxyfluoride intermediate (col. 3, lines 36-42).

Claims 16, 33: '832 incorporates Cima '074 to explain the details of the process. The heating may occur for less than five hours (Fig. 1).

Claims 17, 34, 51: '074 teaches that the solvent may be methanol (a Lewis base) (Example 1).

Claims 20-23, 38: The thickness may be 2-5 microns (col. 14, lines 19-22).

Claims 24, 37: The critical current density may be $1-3 \times 10^6$ A/cm² (Example 2).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

Art Unit: 1762

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 10-11, 13-14, 27-28, 30-31, 40-41, 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuta '020, as applied to claims 9, 12, 26, 29, 39, and 42 above, and further in view of Smith '009.

'020 is discussed above, but does not explicitly teach that the barium or yttrium precursors may be fluoroacetates. However, '009 teaches that barium and yttrium fluoroacetates are suitable precursors for the formation of YBCO superconductors, as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used barium fluoroacetate and yttrium fluoroacetate as the particular precursors of '020 with a reasonable expectation of success and with the expectation of similar results because '009 teaches that they are suitable precursors for the formation of YBCO superconductors. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

13. Claims 16, 20-23, 33, 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith '009.

'009 is discussed above, but does not explicitly teach that the processing time is less than 5 hours. However, col. 19, lines 9-12 indicates that shorter processing times are desired. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the treatment time for the optimum balance of semiconductor properties and processing time.

'009 does not explicitly teach thicknesses greater than 2 microns. However, it does teach that the thickness should be greater than 1 micron (col. 10, lines 5-11). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because

Art Unit: 1762

overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

14. Claims 1-3, 6-7, 12-13, 29-30, 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith '009, as applied to claim 15 above, and further in view of Chen et al. (EP 0 431 813, hereafter '813).

'009 is discussed above, but does not explicitly teach the use of a copper salt other than the trifluoroacetate. However, '813 teaches that in combinations of precursors to make YBCO superconductors, the copper precursor may be copper ethylhexanoate with only enough copper TFA to add fluorine to the intermediate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a copper salt such as copper ethylhexanoate in addition to the copper trifluoroacetate of '009 with the expectation of similar results and with the expectation of similar results because '813 teaches that such combinations are suitable copper precursors for forming YBCO superconductors.

15. Claim 25, 55, 57, 67-77, and 79-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fritzemeier '832.

'832 is discussed above, and teaches that defects should be less than 1.5 microns in diameter (col. 14, lines 45-51), but does not explicitly teach that the defects comprise less than 20 % of the volume of the intermediate. However, '832 teaches that the number of defects should be minimized and that the size of the defects should be minimized (col. 14, lines 37-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have minimized the number and size of any defects (and thus the defect volume fraction) because '832 teaches that such defects are undesirable.

'832 does not explicitly teach critical currents of at least 300 A/cm. However, the preferred range of critical current density (1-3 MA/cm²) and thickness (2-5 microns) yields critical currents of 200-1500 A/cm. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a critical current in this range because it results from using the preferred ranges of critical current density and thickness.

Art Unit: 1762

16. Claims 1-3, 6-8, 12-13, 29-30, 42-43, 66, 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fritzemeier '832, as applied to claim 15 above, and further in view of Chen '813.

'832 is discussed above, but does not explicitly teach the use of a copper salt other than the trifluoroacetate. However, '813 teaches that in combinations of precursors to make YBCO superconductors, the copper precursor may be copper ethylhexanoate with only enough copper TFA to add fluorine to the intermediate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a copper salt such as copper ethylhexanoate in addition to the copper trifluoroacetate of '832 with the expectation of similar results and with the expectation of similar results because '813 teaches that such combinations are suitable copper precursors for forming YBCO superconductors.

Double Patenting

17. Applicant is advised that should claim 9 be found allowable, claims 26, 39, and 83 will be objected to under 37 CFR 1.75 as being substantial duplicates thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicant is advised that should claim 10 be found allowable, claims 27 and 40 will be objected to under 37 CFR 1.75 as being substantial duplicates thereof.

Applicant is advised that should claim 12 be found allowable, claim 42 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 13 be found allowable, claim 43 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 14 be found allowable, claim 44 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 28 be found allowable, claim 41 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 34 be found allowable, claim 86 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Art Unit: 1762

Applicant is advised that should claim 55 be found allowable, claim 57 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 70 be found allowable, claim 71 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 82 be found allowable, claim 84 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.


Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fritzemeier et al. (U.S. Patent 6,562,761) is cited for its teachings of calculating critical current density (J_c) from critical current (I_c) and thickness. Cima et al. (U.S. patent 5,231,074 is cited for the reasons stated above.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Michael Cleveland
Primary Examiner
Art Unit 1762

7/1/2005